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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/761,835	01/20/2004	Jong-Kon Choi	9903-086	4066

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EXAMINER	
MITCHELL, JAMES M	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 08/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/761,835	CHOI, JONG-KON	
	Examiner	Art Unit	
	James M. Mitchell	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This office action is in response to applicant's amendment filed April 10, 2006.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in applicant's original disclosure for a metallic layer attached to a back of a chip without an intervening adhesive layer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S 5,936,758) in combination with Yamamoto et al. (U.S. 4,554,573).

Fisher (Fig 1) discloses:

(cl. 6) a digital micro-mirror device (14; Col. 5, Lines 45-48) package, comprising: a base substrate (46) having a top surface and a bottom surface; an adhesive disposed on the top surface of the base substrate; a semiconductor chip (12) over the adhesive, and electrically connected (24) with the base substrate; one or more mirrors (14; Col. 5, Lines 45-48) mounted on the semiconductor chip; a hermetic sealing means (Abstract) covering the semiconductor chip including the one more mirrors;

Fisher does not show a low melting point, aluminum, metallic layer formed directly on a back surface of a chip, with the chip attached to the top surface of a substrate with an adhesive.

Yamamoto (Fig. 2-3) utilizes an aluminum and therefore a low letting, metallic layer (5) formed directly on a back of a chip with the chip attached to the top surface of a substrate with an adhesive (2).

It would have been obvious to one of ordinary skill in the art to modify the package of Fisher by incorporating a metallic layer between the chip and adhesive in order to eliminate destruction of device due to stress as taught by Yamamoto (Abstract).

Claims 6-10, 12, 13-14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S 5,936,758) in combination with Mullen (U.S. 5,241,133) and Zhao (U.S. 6,882,042).

Fisher (Fig 1) discloses:

(cl. 6, 12, 14) a digital micro-mirror device (14; Col. 5, Lines 45-48) package, comprising: a base substrate (46) having a top surface and a bottom surface; an adhesive disposed on the top surface of the base substrate; a semiconductor chip (12) over the adhesive, and electrically connected (24) with the base substrate; one or more mirrors (14; Col. 5, Lines 45-48) mounted on the semiconductor chip; a hermetic sealing means (Abstract) covering the semiconductor chip including the one more mirrors;
(cl. 13) with the board ceramic (Col. 5, Lines 65-66);

Fisher does not show a copper, low melting point, metallic layer formed directly on a back surface of a chip, with the chip attached to the top surface of a substrate with a metallic adhesive.

Mullen (Fig 6) utilizes a copper and therefore a low melting point, metallic layer (60) on a back of a chip (through adhesive 67) with the chip attached to the top surface of a substrate with a adhesive.
(64) and adhesive (68).

It would have been obvious to one of ordinary skill in the art to modify the package of Fisher by incorporating a copper metallic layer between the chip and adhesive in order to reduce stress as taught by Mullen (Col. 4, Lines 41-42).

The modified structure including Mullen does not appear to explicitly show that its adhesive is metallic of solder or that it is solid at room temperature.

However, Zhao teaches a metallic, low melting point[1] solder adhesive (Col. 7, Lines 16-17) that solid at room temperature.

It would have been obvious to one of ordinary skill in the art to form the adhesive in the modified structure including Mullen with solder of Zhao in order to form an adhesive as required by Mullen (68).

Claims 11 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher (U.S 5,936,758), Mullen (U.S. 5,241,133) and Zhao (U.S. 6,882,042) as applied to claim 6 and 12 and further in combination with Akram (U.S. 2001/004564).

Neither Fisher, Mullen nor Zhao utilize a heat sink attached on the bottom surface of the base substrate.

Akram (Fig. 10) utilizes a heat sink (340) attached on the bottom surface of the base substrate.

It would have been obvious to one of ordinary skill in the art to incorporate a heat sink attached on the bottom surface of the base substrate of the modified structure including Fisher in order to provide heat management as taught by Akram (Col. 7, Lines 57-60).

Claims 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coyle (U.S 2001/0034083) in combination with Ommen et al. (U.S. 5,397,917).

Coyle (Fig 4A, 5A, 6A) discloses:

[1] Same material claimed by applicant.

(cl. 6) a digital micro-mirror device package, comprising: a base substrate (201) having a top surface and a bottom surface; an adhesive disposed on the top surface of the base substrate (Par. 0057); a semiconductor chip (101) over the adhesive, and electrically connected (wires not labeled) with the base substrate; one or more mirrors (102) mounted on the semiconductor chip; a cap (601) covering the semiconductor chip including the one more mirrors;

(cl. 3) and the board consists of plastic (Par. 0055).

Coyle does not show a hermetic seal or copper metallic layer on the back of the chip and a metallic adhesive attached to the semiconductor chip and base.

Ommen utilizes a hermetic seal (Col. 7, Lines 35-36) and a copper metallic layer (Col. 2, Lines 40-42) between a chip (25) and adhesive (17).

It would have been obvious to one of ordinary skill in the art to modify the chip attaching and covering means of Coyle by incorporating a hermetic cap and copper metallic layer between the chip and adhesive in order to provide an heat spreader as thereby dissipating heat and to prevent moisture penetration as taught by Ommen (Abstract & Col. 7, Lines 35-36).

Claims 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Coyle (U.S2001/0034083) and Ommen et al. (U.S. 5,397,917) as applied to claim 6 and further in combination with Gondunsky et al. (U.S. 5,050,040).

Neither Coyle nor Ommen appear to show a heat sink attached to a bottom of the board.

Gondunsky (Fig.1) utilizes a sink (30) attached to a bottom of a board.

It would have been obvious to one of ordinary skill in the art to form a sink attached to a bottom of the modified board of Coyle in order to facilitate heat from a heat dissipating member as taught by Gondunsky (Col. 8, Lines 39-40).

Response to Arguments

Applicant's arguments with respect to his claims have been considered but are moot in view of the new ground(s) of rejection. However in an effort to expedite prosecution of the application, examiner has addressed arguments that may still be relevant.

Applicant contends that his specification including his written description (Page 6, Lines 29-31) and drawing provides support for a metal layer formed on the back of a chip without an intervening layer, since the drawing "clearly shows...nothing comes between metallic layer 115 and the back of semiconductor chip112." Although examiner agrees that applicant's Figure 4 appears to show no intervening material, examiner respectfully disagrees with the amount of support it provides.

For example, while the figure may appear to show a frontal view it fails to show explicitly what is behind the rest of its components. Furthermore, because the claim/ and assertion is for a "negative limitation" the mere absence of a positive recitation of an adhesive in the drawing is not a basis for its exclusion. See M.P.E.P 2173.05 (i). Likewise, the only thing supported by the cited lines is that "[a] metallic layer 115 is formed on the back surface 110b..." Because a metal layer attached to back surface of

a chip by an intervening adhesive is encompassed within the broad scope of a limitation that a metal layer is on back surface, examiner finds no 112 support for applicant's argument.

Lastly, applicant has asserted based on his amendment (e.g. claim 6) that "directly on" appears redundant and not necessary. Examiner agrees, because the limitation still does not preclude an intervening layer. For example, a chip attached to a substrate by an intervening adhesive is still "on" or "directly on" the substrate. By analogy, a chip with an intervening adhesive is still "on" or "directly on" a metal layer.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art further evidences the common use of attaching chip to a substrate with a metal formed on back surface of a chip.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (571) 272-1931. The examiner can normally be reached on M-F 8:00-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jmm, J.D
July 27, 2006

CARL WHITEHEAD, JR.
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